

Private Car Energy Modelling: Comparing two techno-economic approaches for Ireland



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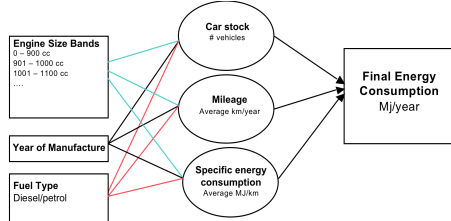
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Car Stock Model

- Simulates the car stock by engine type, fuel & age.
- Calculates energy demand using disaggregated mileage and efficiency



Baseline energy demand is projected to 2050. A range of measures are simulated by varying technology parameters

Measures simulated:

- ◆ 10% EV target, CNGV, Biofuel mixing,
- ◆ New-car efficiency, Scrappage scheme,
- ◆ Tax change

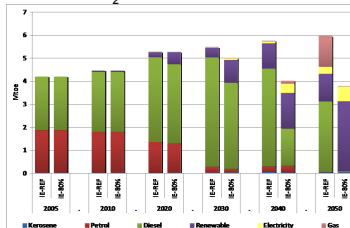
2020 targets:

- ◆ 10% RES-T
- ◆ -20% non-ETS emissions

Irish TIMES Energy Systems Model

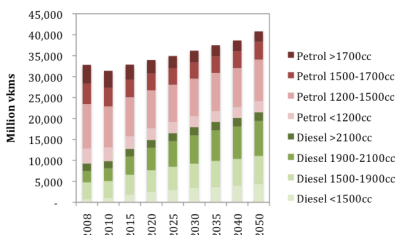
- Identifies the **least-cost energy system** to satisfy demand up to 2050. Emissions constraints are imposed to inform of least-cost **pathways to decarbonisation**.
- For **transport**, private car demand is met in the model by the least-cost mix of technologies, subject to system-wide emissions constraints.

TIMES transport: Reference and -80% CO₂ scenarios to 2050

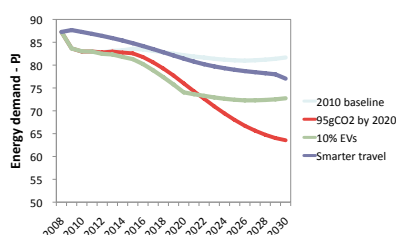


Selected Results

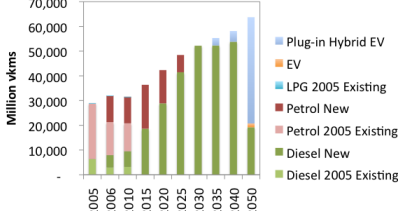
Stock model: Reference activity by vehicle



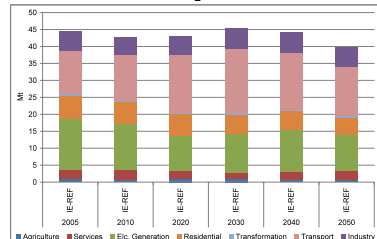
Stock model: Policy scenarios



TIMES: 80% emissions reduction scenario for private car transport



TIMES: reference CO₂ emissions by sector



Energy Models

Energy demand is calculated from certain **parameters**, such as income or technology choice. These models can be used to

- forecast** energy demand by projecting the parameters forward,
- explore **different scenarios** based on different possible parameters.

This research explores how new technologies will effect Irish energy demand and CO₂ emissions, especially in response to policies.

Integrating Models

The models are complementary –

- pkm generated by stock model is inputted to TIMES
- new technology selection produced by TIMES is used in the stock model

Both models have been used to inform inputs to the other

Research Outputs

- [1] Daly H.E. & Ó Gallachóir B.P. 2011 *Modelling private car energy demand using a technological car stock model* **Transportation Research Part D: Transport and Environment** doi:10.1016/j.trd.2010.08.009
- [2] Daly H.E. & Ó Gallachóir B.P. 2011 *Modelling Future Private Car Energy Demand in Ireland*. **Energy Policy** (in review)
- [3] Daly H.E. & Ó Gallachóir B.P. 2011 *Meeting EE, RE and GHG Targets in Private Car Transport – the role of technology*. **Energy Policy** (in review)

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